

CLAIMS

What is claimed is:

1. A die adaptor system for use in a press machine comprising:
 - a lower adaptor including a lower forming plate including a raised upwardly facing contact surface;
 - an upper adaptor including an upper forming plate including a raised downwardly facing contact surface;
 - a tool package formed by said upper adaptor and said lower adaptor, wherein said tool package can be interchanged with a different tool package;
 - a lower shoe detail including a lower die shoe forming a base of said lower shoe detail, wherein said lower die shoe has an upper surface configured to receive said lower adaptor as a part of said lower shoe detail; and
 - an upper shoe detail having an upper die shoe forming a base of said upper shoe detail, wherein said upper shoe detail has a lower surface configured to receive said upper adaptor as part of said upper shoe detail.
2. The die adaptor system of claim 1 wherein said tool package formed by said lower adaptor and said upper adaptor are abuttingly engaged along said downwardly facing contact surface and said upwardly facing contact surface.

3. The die adaptor system of claim 1 wherein said upper surface of said lower die shoe further comprises:

a punch adaptor that rests on the upper surface of said lower die shoe and extends upward from said upper surface; and

a lower binder holder that extends across said lower die shoe, wherein said lower binder holder includes an aperture that circumscribes said upper portion of said punch adaptor to form a recess for receiving said lower adaptor.

4. The die adaptor system of claim 3 wherein said lower adaptor further comprises a lower binder plate that circumscribes said raised upwardly facing contact surface, wherein said lower binder plate functions to size the lower adaptor to fit within said aperture of said lower binder holder.

5. The die adaptor system of claim 3 further comprising a pair of rotating latches which have an end disposed in said aperture of said lower binder holder.

6. The die adaptor system of claim 3 further comprising one or more nitro cylinders dispersed along said upper surface of said lower die shoe, wherein said nitro cylinders provide greater binder holding pressure.

7. The die adaptor system of claim 1 wherein said lower surface of said upper die shoe further comprises an upper binder holder, wherein said upper binder holder has a centrally located aperture for receiving said upper adaptor plate.

8. The die adaptor system of claim 7 wherein said upper adaptor further comprises an upper binder plate that circumscribes said raised downwardly facing contact surface, wherein said upper binder plate functions to size said upper adaptor to fit within said aperture of said upper binder holder.

9. The die adaptor system of claim 7 further comprising one or more keeper pins connected to the upper binder holder, wherein said keeper pins are configured to fasten said upper adaptor to said upper binder holder.

10. The die adaptor system of claim 1 further comprising:
one or more locator pins attached to said upper surface of said lower die shoe and extending toward said upper die shoe; and
one or more locator pin holes in said lower surface of said upper die shoe, wherein said one or more locator pin holes is configured to receive said one or more locator pins during a pressing operation.

11. The die adaptor system of claim 1 further comprising:

a first lower binder holder that rests against two or more raised edges of said lower die shoe and extends across said lower die shoe, wherein said first lower binder holder has an aperture;

a first upper binder holder, extending across said upper die shoe, wherein said first upper binder holder has an aperture;

a second lower binder holder that can be interchanged with said first lower binder holder, wherein said second lower binder holder has an aperture that is a different size or shape than said aperture of said first lower binder holder; and

a second upper binder holder that is configured to be interchanged with said first upper binder holder, wherein said second upper binder holder has an aperture that is a different size or shape than said aperture of said first upper binder holder.

12. The die adaptor system of claim 1 further comprising a lift mechanism positioned below said tool package, wherein said lift mechanism contacts the bottom surface of said lower adaptor to allow said lift mechanism to raise and lower said tool package.

13. The die adaptor system of claim 12 wherein said lift mechanism is a rack and pinion lift mechanism that is integrated as part of said lower die shoe.

14. The die adaptor system of claim 12 wherein said lift mechanism operates by contacting a flange mounted to the side of said lower adaptor.

15. The die adaptor system of claim 12 wherein said lift mechanism is hydraulically or pneumatically operated.

16. The die adaptor system of claim 1 wherein said tool package is a tool package for a punch press having a lower adaptor having a forming surface and one or more punch cores having holes there through, and an upper adaptor having a forming surface and one or more punches configured to align with said holes of said one or more punch cores.

17. The die adaptor system of claim 1 wherein said lower binder holder has one or more chutes that extend through said lower binder holder to a collection pan.

18. A die adaptor system for use in a press machine comprising:
a lower adaptor including a lower forming plate and a lower binder plate, said lower forming plate including a raised upwardly facing contact surface that is encircled by the lower binder plate;
an upper adaptor including an upper forming plate and an upper binder plate, said upper adaptor plate including a raised downwardly facing surface that is encircled by the upper binder plate;

a tool package formed by said upper adaptor and said lower adaptor, said tool package being abuttingly engaged along said downwardly facing contact surface and said upwardly facing contact surface, wherein said tool package can be interchanged with a different tool package;

a lower shoe detail including a lower die shoe forming a base of said lower shoe detail, said lower die shoe including an upper surface configured to receive a punch adaptor that rests on the upper surface of said lower die shoe and extends upward from said upper surface, wherein said lower shoe detail includes a lower binder holder that rests on the edges of said lower die shoe and extends across said lower die shoe, wherein said lower binder holder includes a generally centrally located aperture that circumscribes the upper portion of said punch adaptor; and

an upper shoe detail having an upper die shoe forming a base of said upper shoe detail, wherein said upper die shoe has a lower surface configured to receive an upper binder holder, wherein said upper binder holder has a centrally located aperture for receiving and holding said upper adaptor plate.

19. The die adaptor system of claim 18 further comprising a lift mechanism positioned below said tool package, wherein said lift mechanism contacts the bottom surface of said lower adaptor to allow said lift mechanism to raise and lower said tool package.

20. A method of interchanging tool packages in a die press adaptor system providing a press, a first tool package formed by a first lower adaptor and a first upper adaptor, a lower shoe detail formed by a lower die shoe having an upper surface configured to receive said first lower adaptor, an upper shoe detail including an upper die shoe having a lower surface configured to receive said first upper adaptor, and a second tool package formed by a second lower adaptor and a second upper adaptor, said method comprising:

forming said first tool package, wherein forming the first tool package includes lowering said upper shoe detail toward said lower shoe detail, wherein said first upper adaptor engages said first lower adaptor, disconnecting said first upper adaptor from said upper said shoe detail, raising said upper shoe detail away from said lower shoe detail, and disconnecting said first lower adaptor from said lower shoe detail;

removing said first tool package from said press;

inserting said second tool package into said press;

connecting said second lower adaptor to said lower shoe detail;

lowering said upper shoe detail toward said lower shoe detail; and

connecting said second upper adaptor to said upper shoe detail.

21. The method of claim 20 further comprising providing a lift mechanism configured to raise said first tool package vertically above said lower shoe detail to assist in said step of removing said first tool package from said press.

22. The method of claim 20 further comprising providing one or more keeper pins removably connected through said upper shoe detail, wherein said one or more keeper pins is removed to release said first upper adaptor from said upper shoe detail during said step of disconnecting, and said one or more keeper pins in connected through said upper shoe detail to fasten said second upper adaptor to said upper shoe detail during said step of connecting.

23. The method of claim 20 further comprising providing one or more rotatable latches that are configured to releasably fasten said first and second lower adaptors to said lower shoe detail during said steps of disconnecting said first lower adaptor and connecting said second lower adaptor.

24. The method of claim 20 further comprising:
providing a lower binder holder that rests against two or more raised edges of said lower shoe detail and extends across said lower shoe detail, wherein said lower binder holder has an aperture configured to receive said first lower adaptor; and

an upper binder holder removably connected to and extending across said upper shoe detail, wherein said upper binder holder has an aperture configured to receive said first upper adaptor.

25. The method of claim 24 further comprising:

providing a second lower binder holder having an aperture having a different size or shape than said aperture of said first binder holder;

providing a second upper binder holder having an aperture having a different size or shape than said aperture of said first upper binder holder;

interchanging said first lower binder holder and said first upper binder holder with said second binder holder and said second upper binder holder; and

introducing to said press a third lower adaptor and a third upper adaptor having a size configured to fit within said second binder holder and said second upper binder holder respectively.